Spin reorientation and magnetocaloric properties of $Y_{1-x}Gd_xCo_2$ ($0 \leq x \leq 1$) compounds

Z. Śniadecki,[1,2] N. Pierunek,[1] V. Franco,[3] R. Puźniak,[4] A. Wiśniewski,[4] and B. Idzikowski[1]

[1] *Institute of Molecular Physics, PAS, Poznań, Poland*
[2] *INT, KIT, Eggenstein-Leopoldshafen, Germany*
[3] *Departamento de Fìsica de la Materia Condensada, US, Sevilla, Spain*
[4] *Institute of Physics, PAS, Warsaw, Poland*

$Y_{1-x}Gd_xCo_2$ (x = 0, 0.2, 0.4, 0.6, 0.8, 1) alloys were synthesized in the melt-spinning process. Investigated samples crystallize in the $MgCu_2$-type Laves phase. Due to the substitution of Y atoms by Gd, increase of the lattice constant from 7.215 Å for YCo_2 to 7.250 Å for $GdCo_2$ was observed [1]. One can observe noticeable change of $\Delta S_M(T)$ characteristics at low temperatures and in magnetic fields $\leq$ 3 T. Spin reorientation transition with T_{SR} in the range from 30 to 40 K for samples with x = 0.4 and 0.6 was observed. RC parameter is rather low for all alloys and for instance is equal to 50 and 85 Jkg^{-1} for $Y_{0.6}Gd_{0.4}Co_2$ (T_C = 204 K) and $Y_{0.4}Gd_{0.6}Co_2$ (T_C = 282 K), respectively. Sample with x = 0.2 is ferromagnetic, while those with higher Gd content are ordered ferrimagnetically below T_C with Co-sublattice oriented antiparallel to Gd one.

References:

[1] T. Nakama, A.T. Burkov, M. Hedo, H. Niki, K. Yagasaki, J. Magn. Mater. 226 (2001) 671